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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/656,586	09/04/2003	Yu-Lien Huang	67,200-1133	7926

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TUNG & ASSOCIATES
Suite 120
838 W. Long Lake Road
Bloomfield Hills, MI 48302

EXAMINER

LUND, JEFFRIE ROBERT

ART UNIT	PAPER NUMBER
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1792

MAIL DATE	DELIVERY MODE
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09/05/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/656,586	Applicant(s) HUANG ET AL.	
	Examiner Jeffrie R. Lund	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 April 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5 and 21-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5 and 21-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 2, 21-28, and 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masuda et al, US Patent Application Publication 2002/0000197, in view of Ohta, US Patent 4,526,132.

Masuda et al teaches a vapor deposition processing apparatus 1 that includes a process chamber 16 having a vertical chamber wall defining a chamber interior 14, a showerhead 12 having a lateral surface engaging the chamber wall provided in the process chamber. (Figures)

Masuda et al differs from the present invention in that Masuda et al does not

teach that: the showerhead is held by a plurality of lateral fasteners extending through the chamber wall, each fastener includes a fastener head and threaded shank, or the fasteners structurally isolated from the chamber interior.

Ohta teaches supporting a gas source 37 with a plurality of lateral screws 52 extending through the chamber wall 39, structurally isolated from the chamber. The fasteners are physically separated from the chamber interior and the separation inherently prevents particle contamination of the chamber interior by thermal cycling of the fasteners. (Figure 3)

The motivation for attaching the showerhead of Masuda et al with the lateral screws of Ohta, through the chamber wall into the showerhead, is to provide a means of mounting the showerhead of Masuda et al as required by Masuda et al but not described.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to attach the showerhead of Masuda et al using a plurality of lateral screws as taught by Ohta.

4. Claims 3, 5, 29, 30, 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masuda et al US Patent Application Publication 2002/0000197, and Ohta, US Patent 4,526,132, as applied to claims 1, 2, 21-28, and 31-34 above, and further in view of Lilleland et al, US Patent 6,073,577.

Masuda et al and Ohta differ from the present invention in that they do not teach a gas mixing plate and confinement ring.

Lilleland et al teaches an apparatus that includes: a showerhead 14 with a gas

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mix plate 22; and a confinement ring 17. (Figure 1, column 2 line 22 through column 3 line 14)

The motivation for adding a mixing plate and confinement ring of Lilleland et al to the apparatus of Masuda et al and Ohta is to more uniformly distribute the processing gas.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to add the gas mixing plate and confinement ring of Lilleland et al to the apparatus of Masuda et al and Ohta.

5. Claims 1, 2, 21-28, and 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masuda et al, US Patent Application Publication 2002/0000197, in view of Graves, US Patent 4,331,352, and Ohta, US Patent 4,526,132.

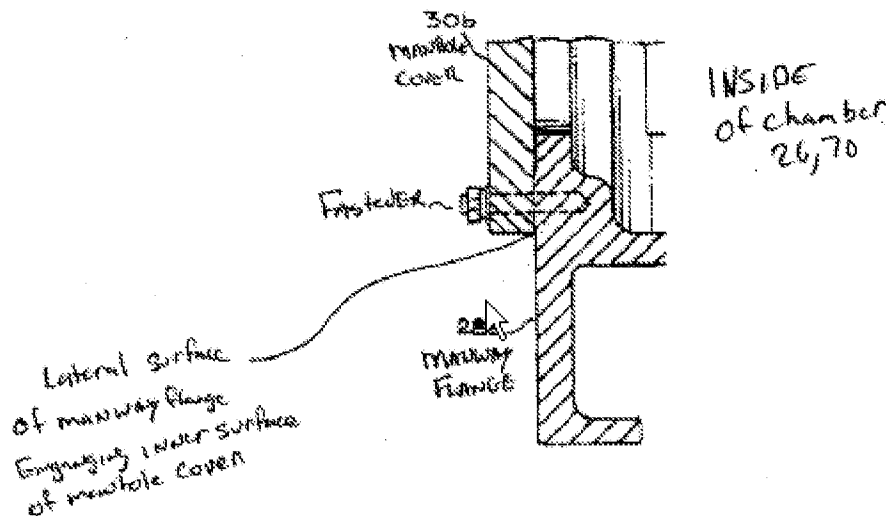
Masuda et al teaches a vapor deposition processing apparatus 1 that includes a process chamber 16 having a vertical chamber wall defining a chamber interior 14, a showerhead 12 having a lateral surface engaging the chamber wall provided in the process chamber. (Figures)

Masuda et al differs from the present invention in that Masuda et al does not teach that: the showerhead is held by a plurality of lateral fasteners extending through the chamber wall, each fastener includes a fastener head and threaded shank, and the fasteners structurally isolated from the chamber interior.

Graves teaches a manhole cover 30b which is part of the chamber wall defining an interior space, and a manway flange 28b which is interior to the manhole cover 30b. The manway flange 28b has a lateral surface that engages the inner surface of the

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manhole cover of the chamber wall, and a fastener physically separated from the chamber interior and prevents contamination of the chamber caused by thermal cycling of the fastener. As clearly seen in figure 5, and reproduced below:



(Figure 5)

Ohta teaches supporting a gas source 37 with a plurality of lateral screws 52, structurally isolated from the chamber. (Figure 3)

The motivation for attaching the showerhead of Masuda et al with the lateral screws of Graves is to provide a means of mounting the showerhead of Masuda et al (i.e. an interior part having a lateral surface engaging the chamber wall) as required by Masuda et al but not described.

The motivation for using a plurality of fasteners as taught by Ohta is to securely attach the showerhead of Masuda et al to the chamber wall.

Therefore it would have been obvious to one of ordinary skill in the art at the time

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the invention was made to attach the showerhead of Masuda et al using a plurality of lateral fasteners as taught by Graves and Ohta.

6. Claims 3, 5, 29, 30, 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masuda et al, Graves, and Ohta, as applied to claims 1, 2, 21-28, and 31-34 above, and further in view of Lilleland et al, US Patent 6,073,577.

Masuda et al, Graves, and Ohta differ from the present invention in that they do not teach a gas mixing plate and confinement ring.

Lilleland et al teaches an apparatus that includes: a showerhead 14 with a gas mix plate 22; and a confinement ring 17. (Figure 1, column 2 line 22 through column 3 line 14)

The motivation for adding a mixing plate and confinement ring of Lilleland et al to the apparatus of Masuda et al, Graves, and Ohta is to more uniformly distribute the processing gas.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to add the gas mixing plate and confinement ring of Lilleland et al to the apparatus of Masuda et al, Graves, and Ohta.

Response to Arguments

7. Applicant's arguments filed September 28, 2007 have been fully considered but they are not persuasive.

In regard to the argument that:

Masuda et al. nowhere suggests or discloses how the showerhead 12 is installed. Masuda et al. nowhere describes that the showerhead engages the chamber wall or if a confinement structure is used to direct the gas from the gas storage space 18 through the showerhead. In any event, assuming arguendo that one may speculate from the schematic shown in Masuda et al. that the showerhead engages the chamber wall, which Applicants do not

concede, Masuda et al. nowhere suggests or discloses how the showerhead 12 is installed.

The Examiner disagrees. It is true that Masuda et al does not disclose how the showerhead 12 is installed. Masuda et al clearly shows that the showerhead engages the chamber wall in figures 1-5, 7-10 and 16, and does not contain any other structure. Furthermore, Masuda et al also teaches that the gas flows from the gas storage chamber 18 through the small holes of the shower plate 12 and sprayed into the reactor chamber. If the showerhead did not engage the wall gas would also flow from the gas storage chamber 18 around the edges of the showerhead and into the reactor chamber. Therefore, one of ordinary skill in the art, reading the drawings and teachings of Masuda et al, would conclude that the showerhead engages the chamber wall so that the gas is supplied only from the holes of the showerhead.

In regard to the argument that Masuda et al and Ohta fail to suggest or disclose “an apparatus to reduce particle contamination to a semiconductor device process chamber interior by thermal cycling of fasteners”, the Examiner disagrees. This limitation is an intended use of the apparatus and is inherent in the connection taught by Ohta. Thus attaching the showerhead to the chamber wall of Masuda et al with screws not exposed to the interior of the chamber as taught by Ohta would result in reducing particle contamination to a semiconductor device process chamber interior by thermal cycling of fasteners.

In regard to the argument that Masuda et al and Ohta fail to suggest or disclose “a plurality of exterior fasteners extending through and penetrating said chamber wall and into said showerhead, the Examiner disagrees. As discussed above and in the

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rejection Ohta clearly teaches fasteners extending through a chamber wall to fasten two parts of a chamber together, and such fasteners would be physically separated from said chamber interior and prevent particle contamination. Applicant is too narrowly interpreting the term "chamber wall". The flange 39 of Ohta is part of the chamber wall, and the bolts extend through and penetrate the chamber wall.

In regard to the arguments directed to the Examiner's application of KSR, the Examiner believes that KSR has been applied in accordance with Office policy.

In regard to the argument:

For example, Examiner has not shown in the prior art that Applicant's invention involves a known technique" applied to semiconductor device process chambers such as vapor deposition, ashing or etching chambers; rather the disclosure of Ohta demonstrates that such technique is not known since the mounting bolts of Ohta are specifically designed not to penetrate the chamber wall into the chamber interior which would make the sub-atmospheric processing chamber of Ohta unworkable. The bolts of Ohta do not penetrate the chamber wall into a structure in the chamber interior.

The Examiner disagrees. First, the "technique" in question is using a screw or bolt to attach an exterior part and an interior part to each other. This "technique" has been used for hundreds of years and is so common and expected that they are rarely shown because it is expected that one of ordinary skill in the art will inherently and unfailingly understand where and how to use them. Second, as discussed above the bolts of Ohta penetrate the flange and the flange is part of the wall. Third, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.

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See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). Fourth, the claims do not require that bolts extend into a structure in the chamber interior.

In regard to the arguments

In addition, Examiner has not shown in the prior art any suggestion or expectation of success of such a technique, or any recognition of any expected improvement resulting therefrom or any evidence of predictable results. For example, it might be expected that that passing bolts to penetrate the chamber wall to attach a structure within in the process chamber would interfere with any processes including sub-atmospheric processes associated with vapor deposition, ashing or etching chambers unworkable.

The Examiner disagrees. The expectation of success and the predictable result comes from the general knowledge of one of ordinary skill in the art. Evidence supporting the level of skill in the art and proving the example false can be found in Applicant's disclosure. The Examiner notes that the Applicant has disclosed no special structure to maintain the atmospheric processes inside the chamber. The Examiner believes that this is because the Applicant knows that the skill of sealing a bolt hole in a chamber wall is well known in the art. If this is not correct, the disclosure will be rejected under 112 1st paragraph as being nonenabling. Second, recognition of the any expected improvement is not required for obviousness, only a suggestion, motivation, or teaching for making the combination is required.

In regard to the argument:

Examiner has further failed to show in either reference a recognition of the problem, or a solution thereto, that Applicants have recognized and solved by their invention:

"An apparatus to reduce particle contamination to a semiconductor device process chamber interior by thermal cycling of fasteners"

The Examiner disagrees. The fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the

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basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

In regard to the argument:

Examiner has not shown any teaching or suggestion in the prior art to produce Applicants invention. Indeed Examiner has not shown anywhere in the prior art where fasteners extend through and penetrate a chamber wall and are embedded into any structure in the interior of a process chamber as claimed by Applicants.

The Examiner disagrees. The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

In regard to the argument:

Applicants respectfully request Examiner provide evidence that Applicants 'technique' of attaching structures interior to a process chamber by fasteners extending from the exterior of the chamber through and penetrating the chamber wall into the structure interior to the process chamber is "well known".

The Examiner argued that the "technique" of attaching two parts is well known, and it would have been obvious to attach the showerhead of Masuda et al with screws or bolts as taught by Ohta or Graves. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In regard to the argument:

In addition, it is noted that modifying Masuda et al. with the confinement ring of Lilleland et al. would ensure that the showerhead of Masuda et al. does not engage the reactor walls, as

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the confinement ring of Lilleland et al. engages the chamber walls (see col 2, lines'49-54) rather than the showerhead electrode 10 of Lilleland et al., thus further ensuring that such modification does not produce Applicants invention.

The Examiner disagrees. Lilleland et al teaches in column 2 lines 49-54 that:

The purpose and function of confinement ring 17 is to cause a pressure differential in the reactor and increase the electrical resistance between the reaction chamber walls and the plasma thereby confining the plasma between the upper and lower electrodes.

Thus Lilleland et al does not teach that the confinement ring engages the walls, but that they increase the resistance between the plasma and the wall. Therefore, the argument is moot.

In regard to the arguments directed to Masuda et al and Graves, the Examiner disagrees for the following reasons:

- a. Graves is analogous art in that it is directed to the same problem, specifically, attaching an interior part of an apparatus to a chamber wall with a fastener. Thus, Graves is analogous art. The base problem addressed by the Applicant is how to attach a showerhead to a processing chamber. Thus any patent teaching how to attach an interior part to an exterior part is analogous art.
- b. The term "processing chamber" is extremely broad and includes heat exchangers in that the heat exchanger processes a fluid by transferring heat to or from the fluid. In the present invention the chamber can be defined as anything interior of the outer wall of Graves.
- c. The limitation of endeavor as a process chamber "selected from the group consisting of a vapor deposition chamber, an ashing chamber and an etching chamber" is taught by Masuda et al. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations

of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrie R. Lund whose telephone number is (571) 272-1437. The examiner can normally be reached on Monday-Thursday (10:00 am - 9:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-

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273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Jeffrie R. Lund/
Primary Examiner
Art Unit 1792

JRL
9/3/08